LAW OFFICES
DENNISON, SCHULTZ, DOUGHERTY & MACDONALD
SUITE 105
1727 KING STREET
ALEXANDRIA, VIRGINIA 22314-2700
703 837-9600

REMARKS

The Office action of June 29, 2005, has been carefully considered.

Claims 1 through 14, 18 through 26 and 28 through 32 have been rejected under 35 U.S.C. 102(b) as anticipated by Clingman et al, while Claim 27 has been rejected under 35 U.S.C. 103(a) as obvious over Clingman et al.

The invention is directed to die coating for a metal mold or a die component, as well as to a process for providing the coating and to the metal mold or die itself. The coating is formed by co-deposition using thermal spraying of a powder of a ceramic material and a powder of organic polymer material, followed by heating the co-deposited layer to remove the polymer material and provide a porous layer of ceramic material. As now recited in Claim 1, the porous layer has a thickness of about 250 to 400 μm.

According to process Claim 8, the heating step takes place to a temperature of less than 450°C. New claims 33-40 incorporate the particle sizes of the starting materials.

Clingman et al is directed to an abradable ceramic seal coating on at least one of a pair of members having relative rotational movement. The coating is typically formed of stabilized zirconia which is co-deposited using a flame spray technique with a polyester powder. After the layer is deposited onto a substrate, the substrate is heated to a temperature of about 1800°F (982°C) for an appropriate period of time to remove the polyester powder, and leave a porous ceramic coating of stabilized zirconia. The purpose of this coating is to wear away during rubbing contact with another member.

According to the claimed invention, the coating is a die coating formed on a metal mold or metal die component, which

is an insulating coating to control solidification of molten metal in die casting applications. As stated at page 2, lines 2-4, of the specification, "...wear resistance is important since a coating with an inadequate level of wear resistance is prone to damage in use, with a subsequent reduction in its useful life-time." Hence, the purpose of applying the coating is contrary to that of Clingman et al, which desires a ceramic layer which is abradable, and which will wear away. The porosity provided in the die coating of the invention is provided for the purpose of increasing insulation and wearability, contrary to the purpose of the porosity in the citation which is provided to enhance the abradability.

The abradable porous layer of Clingman et al has a thickness in the range of 0.040 to 0.060 inches, which is machined to a useful thickness of 0.18 to 0.02 inches (col 3, lines 30-36). This useful thickness corresponds to 457-508 μm, as compared with the coating thickness of the invention of about 250 to 400 μm. The benefit of the thinner coating layer of the invention is that a lower temperature is required to completely decompose all of the polymer. For example, a temperature of no more than 450°C is necessary according to the invention to decompose the polymer, whereas a temperature of at least 982°C (1800°F) is required according to Clingman et al.

This is especially important when applying coatings to metal die molds or metal die components. Metal die molds and their components are often made from die steel which undergoes phase transformation when heated to a temperature above about 500°C. Such phase transformations affect the shape and physical dimensions of the die and in developing a coating process for a metal die mold, one of ordinary skill in the art would seek to use a coating process which is performed at a

LAW OFFICES
DENNISON, SCHULTZ, DOUGHERTY & MACDONALD
SUITE 105
1727 KING STREET
ALEXANDRIA, VIRGINIA 22314-2700
703 837-9600

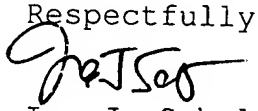
low temperature, e.g. under 500°C. Hence, the coating defined by the invention has different characteristics, is formed by a different process and is produced for different reasons than that of Clingman et al. One of ordinary skill in the art would not look to Clingman et al to obtain a metal die coating.

Another feature which distinguishes the invention from the Clingman et al reference is the size of the ceramic particles and polymer particles used. According to Claims 33 to 40, the ceramic material of the invention has a particle size of 1 to 60 μm and the particle size of the polymer material is in the range of 5 to 45 μm (as supported by Claim 7 as filed and Examples 1, 2 and 3). Clingman et al discloses a particle size for the polyester powder as being in the range of -140 to +325 mesh, and this is thought to be greater than the particle sizes presently claimed. It is hypothesized that the smaller particle size of polymer would result in smaller pores in the resulting ceramic layer, and hence a larger polymer particle would make the ceramic layer more porous, reducing wear resistance and making the layer more abradable. While this is the purpose of Clingman et al, it is clearly not the purpose of the claimed invention.

Withdrawal of these rejections is accordingly requested.

In view of the foregoing amendments and remarks, Applicants submit that the present application is now in condition for allowance. An early allowance of the application with amended claims is earnestly solicited.

Respectfully submitted,



Ira J. Schultz
Registration No. 28666

LAW OFFICES
DENNISON, SCHULTZ, DOUGHERTY & MACDONALD
SUITE 105
1727 KING STREET
ALEXANDRIA, VIRGINIA 22314-2700
703 837-9600